

## TUBERCULOSIS IN FOWLS.

By ARCHIBALD R. WARD, D. V. M.,  
University of California, Berkeley.

IN ACCORDANCE with the provisions of the legislative act creating the California Poultry Experiment Station, and in compliance with the oft-repeated request of poultrymen, investigations have been made during the past summer on poultry diseases. Dr. V. A. Moore\* of Cornell University, and the writer, have made frequent excursions in the poultry-raising districts and have, through the courtesy of many interested individuals, obtained diseased fowls for examination in the bacteriological laboratory at Berkeley. One of the conclusions drawn from the summer's work is that tuberculosis is one of the important diseases of fowls. While much remains to be done in the way of conducting practical tests of the means of controlling the disease, some facts are available for publication at the present time. Tuberculosis in fowls is a well-known disease in Europe, and its control has been discussed by Dr. med. F. A. Zürn (1), Cameron (2), Meek (3), Zürn (4) and F. S. Zürn (5). The disease is described by several American writers, among them Salmon (6) and Chester (7), but the writer has so far succeeded in finding but one American writer—Pernot (8)—describing an outbreak of the disease.

As observed by the present writer, the disease exists extensively among the large poultry ranches, but seldom kills a sufficient number of fowls at any one time to excite the alarm of the owner. Its existence in a flock constitutes a steady drain, but it attracts slight attention because poultrymen are accustomed to large losses from diseases and reckon such as a part of the business. In one instance the disease was brought to the attention of the writer by an owner who reported a loss of about 250 out of a flock of 1400 fowls in a year. The owner had made a large number of post mortem examinations, and as the lesions are easily recognized, the observation has some interest.

Symptoms are only noticeable in advanced cases. The bird becomes excessively emaciated, a condition which is easily recognized by the atrophy of the pectoral muscles. The victim crouches from weakness and in some cases lameness or peculiarity of gait are observed. Post mortem examination of lame hens has sometimes revealed tubercular lesions of the femoro-tibial articulation, and in other cases no lesions in the legs could be demonstrated. The comb is usually pale and the voice is weakened in some cases. The attitude, condition of the feathers, etc., constitute features by which a bad case of tuberculosis in the hen may be recognized at a glance, quite as readily as a similar case in man.

The following observations are based upon thirty post mortems. Lesions are most frequently shown by the liver and spleen. The liver may be more or less enlarged, altered in color and sprinkled with gray or slightly yellowish tubercles varying from 3mm. in diameter down. (See Fig. 1.) The spleen may merely show small tubercles

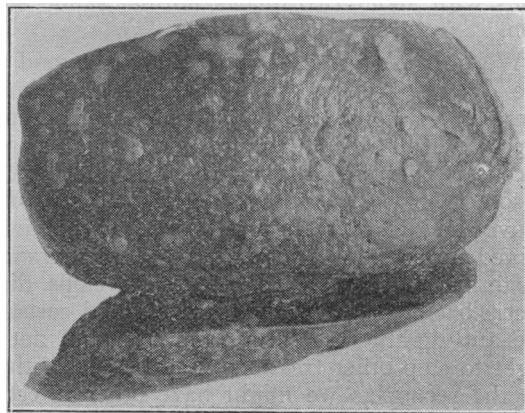


Fig. 1.

or may be distended to several times its normal size by tubercular growths. The mesentery is occasionally sprinkled with tubercle as shown in Fig. 2. Tubercles on the intestines are quite com-

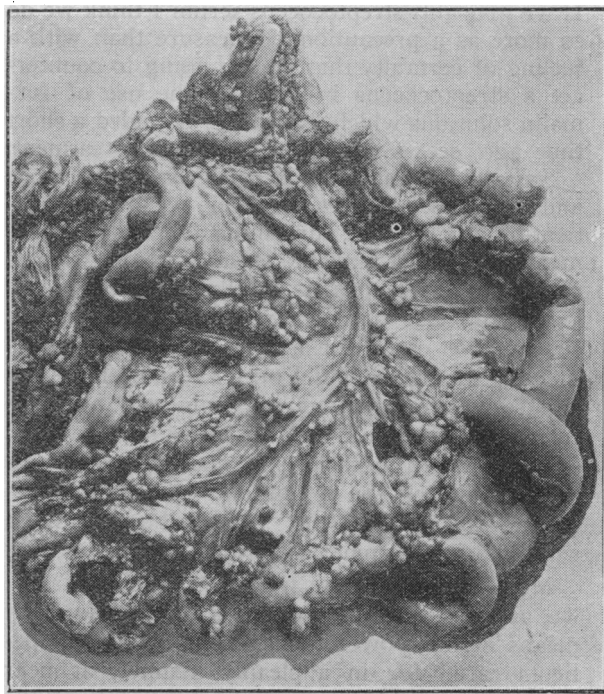


Fig. 2.

mon and not infrequently hollow tubercular masses as large as a walnut communicate directly with the lumen of the intes-

\* The writer desires to acknowledge the assistance rendered by Dr. Moore in collecting the data upon which this article is based. A more comprehensive paper was read at the recent meeting of the American Veterinary Medical Association and will appear in the forthcoming volume of the transactions of that association.

tine. Lesions of the heart, kidneys, lungs and skin are comparatively uncommon. In one case only have the lungs been involved—sprinkled thickly with small, grayish, glistening tubercles about the size of a millet seed.

The one case in which the skin was involved presented interesting lesions. The fowl was very much emaciated and the pectoral muscles were practically all atrophied. (See Fig. 3.) The skin

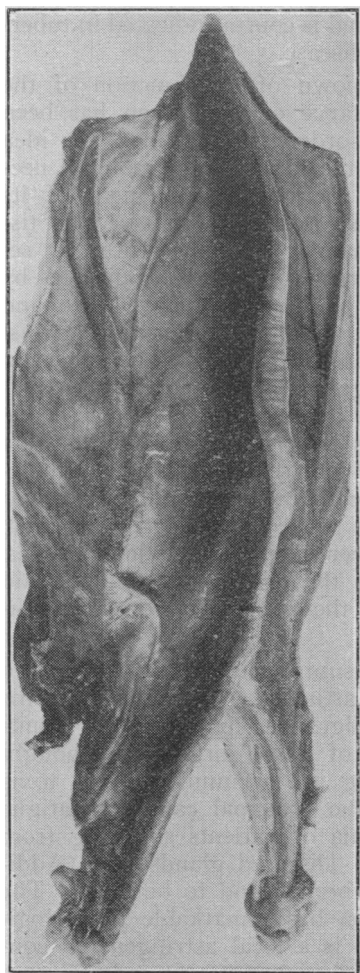


Fig. 3.

was sprinkled with isolated and grouped nodules varying in size from 1 to 10 mm. in diameter. They are especially numerous on the neck (See Fig. 4), breast, inside of thighs and wings. On the skin over the crop extending back along the median line to the sternum, and about the cloaca, were thick masses of tubercular nodules. Large masses were beneath the right eye, also. In all cases the nodules were confined to the skin proper, the subcutis and muscles not being involved. The tubercles seemed, in nearly every case, to be at the root of the feather. The tubercles were encased in a membranous capsule and on section

appeared to consist of a whitish semi-solid substance which was easily expressed by pressure. The internal organs were normal. Tubercle bacilli were readily demonstrated in the various lesions from time to time by stained smears and in sections. Cultures were likewise obtained. Mention of the avian tubercle organism immediately suggests several important questions about the relation of avian to human and bovine tuberculosis, but the writer is not prepared to discuss these topics at present.

In considering the possible hygienic significance of fowl tuberculosis, the desire is awakened to

know whether or not the organisms are present in the egg. It appears to be true that hens badly infected do not lay. In the thirty post mortems of tuberculous hens that have come under the writer's observation, but one hen contained an egg in the oviduct. The thorough cooking to which poultry is subjected renders rather remote the possible danger of human infection by ingestion. Careful observations to determine if newly hatched chicks suffer from tuberculosis will throw light on the question of tubercle bacilli in eggs.

The tuberculin test apparently is not available for diagnostic purposes. About twenty tuberculous hens have been tested with varying doses of tuberculin from a manufacturing house and that prepared by the New York State Veterinary College, without satisfactory change in temperature. Some tuberculin is being prepared from a culture of the avian tubercle organism. Should the tu-



Fig. 4.

berculin test prove successful on hens its use would have to be restricted to the laboratory. It would be hopelessly impracticable to attempt to weed out tuberculous hens because of the great number of individuals flocking together under the conditions obtaining in the poultry industry in California. Under these circumstances all the individuals of an infected flock must be regarded as possible sources of danger to healthy birds. Taking advantage of the experience in the control of tuberculosis in cattle, we can rest assured that a flock of healthy birds can be raised if constantly kept from contact with tuberculous birds and on land that has not recently been contaminated with diseased ones. The useful life of a hen is so short that there is justification for believing that such a procedure would, in three or four years, result in the eradication of the disease.

In some chicken ranches where the disease is prevalent, all the available land is already utilized

for fowls, which fact would necessitate fencing off a piece of the infected land for separating the young stock from the old infected ones. Such a procedure would involve the disinfecting of land and buildings. Buildings could be readily cleansed by some of the creolin preparations already employed against mites, but the disinfection of extensive areas of land offers a more serious, but by no means insurmountable, obstacle. Sunlight can be depended upon in time to kill the tubercle bacilli in the surface layers of the soil, but just how quickly this can be accomplished remains to be determined.

It is believed that the spread of the disease among flocks of diseased fowls might be lessened by weeding out all hens that are poor and have pale combs. These might be kept in a separate enclosure until their gradual decline or recovery decides the question whether or not they are diseased.

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## THE DUCTLESS GLANDS.\*

By W. E. UPTON, M. D., Napa.

THE ductless or vascular glands elaborate materials which produce through the circulatory system definite influences over remote parts. Some of these chemical materials are highly antitoxic and necessary for the preservation of life. Thyroid medicinally given internally, produces increased activity of combustion throughout the body, and in certain conditions much loss of weight. Myxedema gives an example of increased metabolism when thyroid gland is given. This increase of metabolism does not occur, however, in all who take it. The best effect is where there is a condition of obesity with myxedema. Thyroid extract has been administered successfully in myxedema, which is due to absent or inactive thyroid, characterized by lowered temperature, impaired intellect, memory and speech, skin thick and dry, with shedding of epithelium. Under thyroid treatment myxedema patients soon improve. The normal temperature returns, intelligence, memory and speech are restored and thickening of the skin disappears; which return when the remedy is stopped. Cretinism is congenital myxedema, and has improved under thyroid treatment, but returns with suspension of treatment.

Thyroid gland given in cretinism is very active, and the patient becomes reduced in size at

first by loss of unhealthy fat. There is increased appetite and improved digestion, then gain in weight, in healthy, firm tissues, soft moist skin the gradual improvement of brain tissue and mind. Simple goitre is often greatly benefited or cured by thyroid treatment. In many skin diseases it also has given good results and it has been recommended for many other diseases. Symptoms of thyreoiditis are tachycardia, depression, glycosuria, albuminuria, exophthalmos and irritability. Thyroid is contra-indicated in tuberculosis and heart disease.

Very little is known of the function of the spleen. The substance of the spleen has been used in various disorders of the blood, the idea being to supply to the tissues some material necessary to health. Serious improvement of its functions by disease is usually followed by tissue change and changes in temperature. It secretes some bactericide which is indicated by enlargement of the organ in many acute and infectious diseases, as though working against the germs of disease. The use of the spleen in medicine was suggested by that organ's enlarging in some cases of cretinism and myxedema. In medicine it has been found to aid digestion and nutrition and increase the cutaneous circulation. It gives rise to increased number of red corpuscles, and has proved of benefit in anaemia, also in typhoid fever by producing leukocytosis. It steadily reduces the temperature and is said to quickly restore the patient to normal condition.

Disease of the suprarenal gland is followed by progressive asthenia, bronzing of the skin, loss of digestive power and vomiting. Destruction of these organs is thought capable of causing an accumulation of toxic agents, which is the principal cause of fatigue and general asthenia of patients suffering from Addison's disease. Diseased glands from Addison's disease have been found to be inert. The suprarenal secretion has remarkable physiological properties, and is a local astringent or constrictor and cardiac stimulant. It reduces congestion and hastens the absorption of inflammatory tissue. It has given good results in Addison's disease and in exophthalmic goitre. It lessens the heart beats and decreases the size of the thyroid gland. A toxic substance has been isolated from the suprarenals which is identical with muscle poisons originating in the muscles. a substance foreign to the suprarenal capsules. These organs appear to have the destruction of toxic products as a function.

The thymus gland is active only during the first two or three years of life during rapid development, after which it becomes atrophied. Its physiological action appears to be similar to that of the thyroid gland, except that it is weaker.

\* Read before the Napa County Medical Society.